Austin Water Utility

Small and Large Diameter Water Distribution System Leak Detection Program

Submitted for consideration for the Recover Act of 2009 Challenge Grant Program: Water Marketing and Efficiency Grants, Funding Opportunity Announcement No. 09SF811499

City of Austin / Austin Water Utility
Water Distribution System Engineering
Mark Dollins, Division Manager
Austin Water Utility
P.O. Box 1088
Austin, TX, 78767
mark.dollins@ci.austin.tx.us
Phone: (512) 972-0171
Fax: (512) 972-0228

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(1) Executive Summary

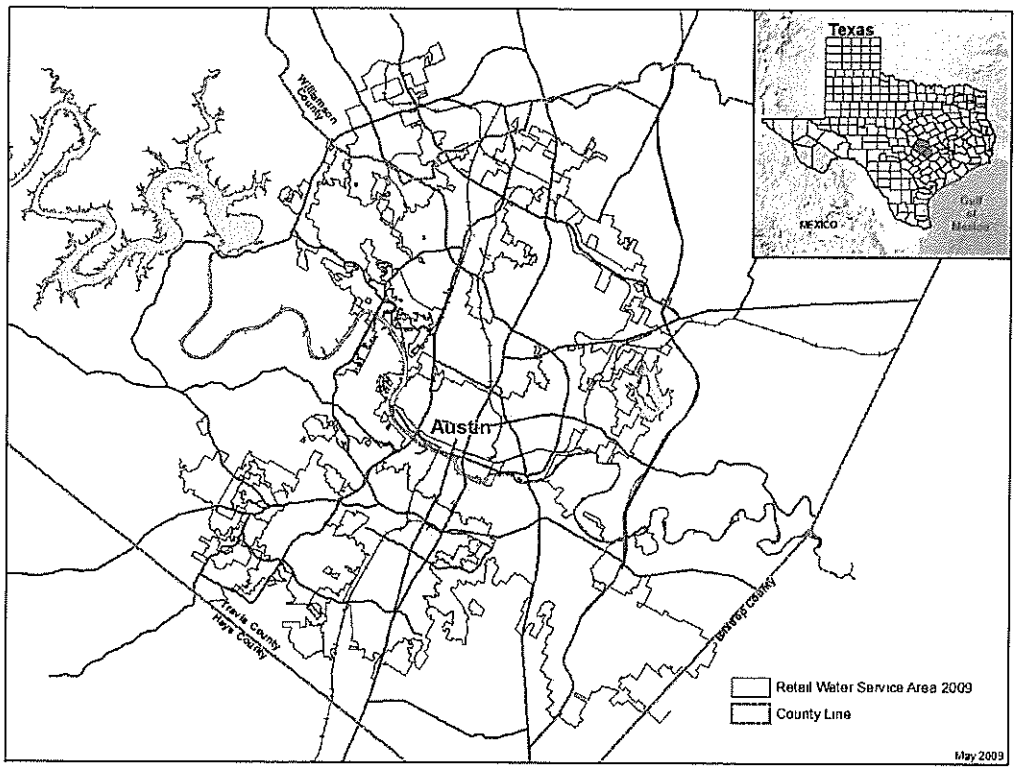
May 22, 2009
City of Austin /Austin Water Utility
City: Austin
County: Travis and Williamson
State: Texas

The Small and Large Diameter Distribution System Leak Detection Program is a program currently being enhanced in the Austin Water Utility (AWU). This program will address Task B of the funding opportunity Announcement, New Technologies for Improved Water Management, by utilizing new leak detection technology to identify unreported leaks in our aging water distribution infrastructure. Like all other major water utilities, AWU has been experiencing water loss. It is believed that the largest source of water loss is the result of reported and unreported breaks and leaks. Based on the most recent AWU Water Loss Calculation, the Utility experienced 11.88% water loss or 5.5 billion gallons of water in FY 2007. Of that 11.88%, 7.68% or 3.6 billion gallons was attributed to reported and unreported breaks and leaks. Realizing these losses, AWU is starting a new initiative to not only increase the amount of leak detection for the small distribution lines but also begin a new program for leak detection and repair on its transmission lines. Stopping this water loss plays a major role in the conservation programs of the Austin Water Utility.

Average annual acre-feet of water supply:	156,747
Estimated water saved:	18,881
Estimated water better managed:	N/A
Estimated and current water marketed:	N/A
Length of project:	9 months
Estimated completion date:	April, 2010
Applicant is in Reclamation District:	No

(2) Background Data

The City of Austin retail water service area is within the State of Texas. The service area includes portions of Travis, Williamson and Bastrop Counties. The City's municipally owned water utility, Austin Water, supplies water to customers within and outside the corporate city limits of Austin, as well as the communities of Rollingwood, Sunset Valley, Pflugerville and Round Rock, one water control and improvement district, five water supply corporations, seven municipal utility districts, and three private utilities.

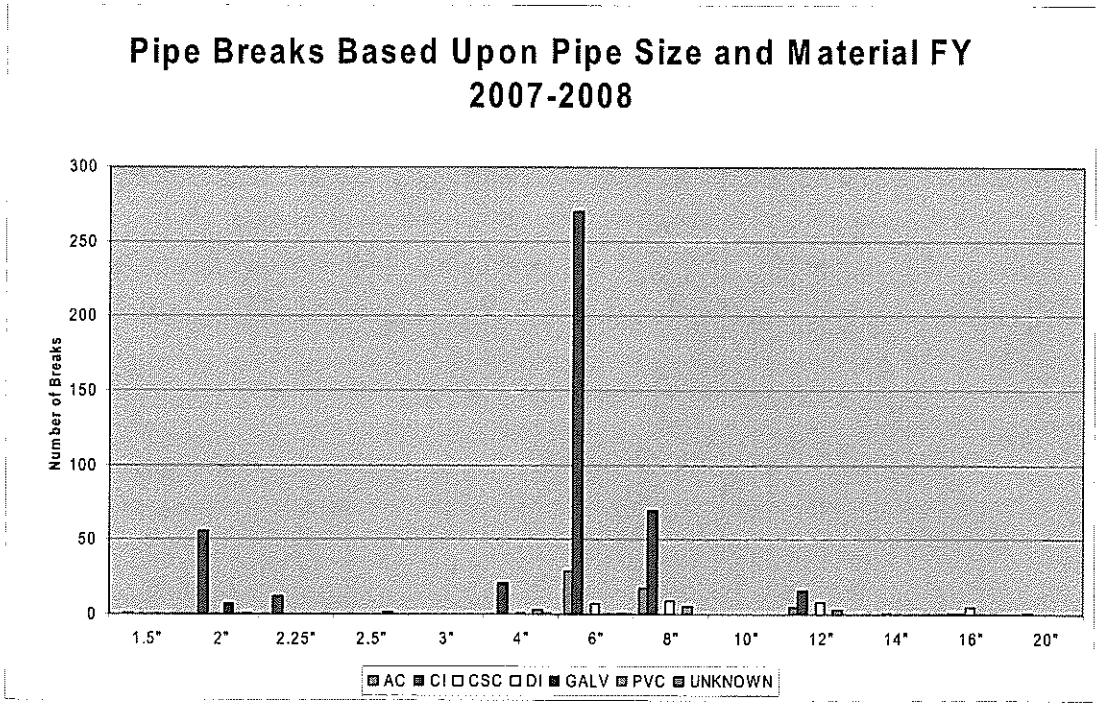


The source of water supply for the Austin Water Utility is the Colorado River. The City of Austin holds permitted municipal water rights granted by the State of Texas to divert a maximum of 292,703 acre-feet per year (AF/yr) from the Colorado River for municipal use.

These water rights are run-of-river rights in the State's priority water rights system. This means that the City of Austin is permitted to divert water under these rights if the water is available for diversion after other more senior water rights are first fulfilled. The City of Austin currently serves 853,844 water users. There are no anticipated shortfalls in the City water supply. The City of Austin has secured water rights through the end of the century and will continue to work with the Lower Colorado River Authority to insure a constant water supply. Austin Water Utility currently has 200,000 service connections, 3,594 miles of City maintained water lines, 611 miles of transmission lines (16" or greater), 2,983 miles of distribution lines (16" or less), 37 City maintained reservoirs, 45

City maintained pump stations and local boosters and 167 million gallons of effective storage capacity. The City of Austin has not had any past working relationships with the Bureau of Reclamation.

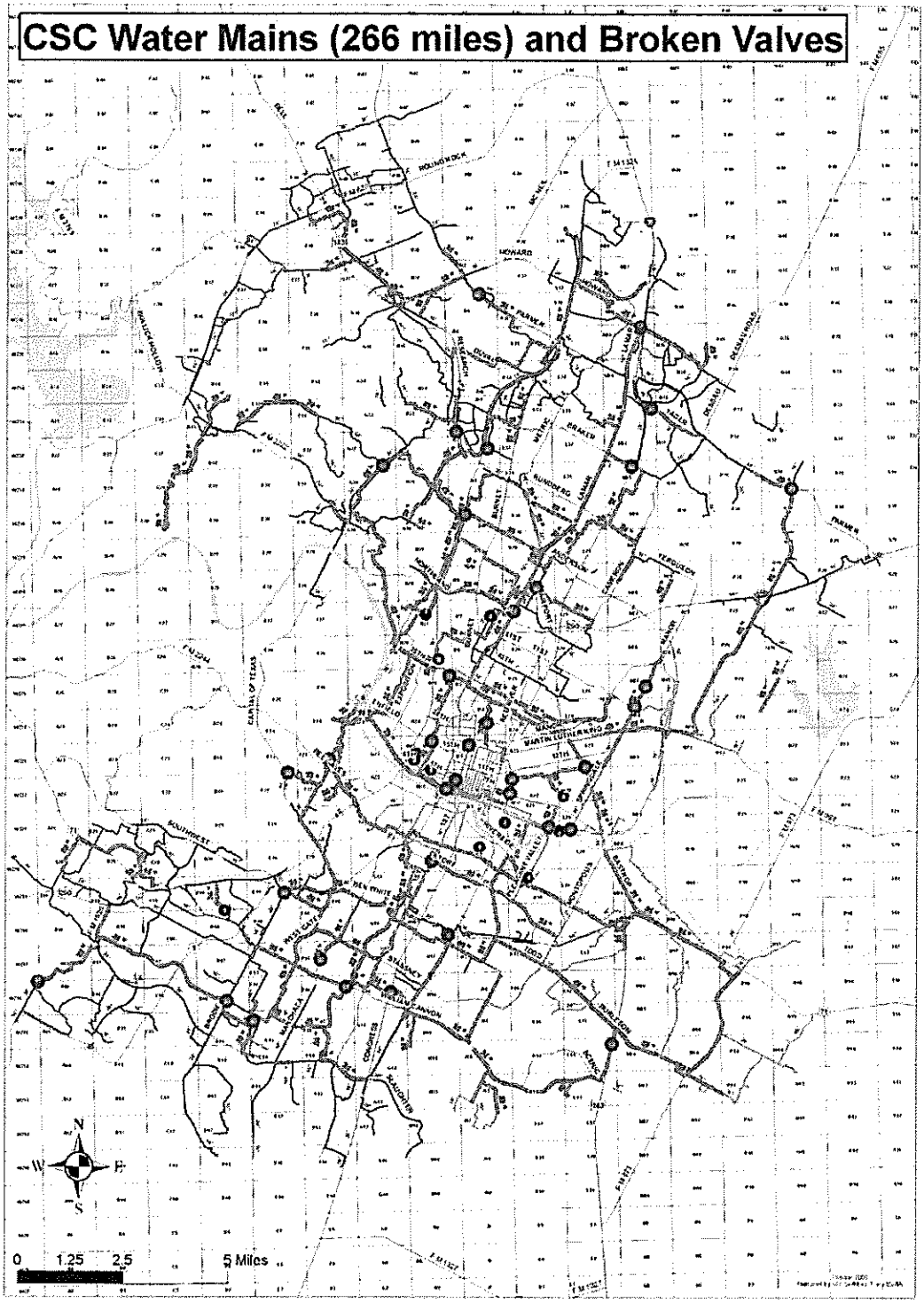
For about the last 10 years AWU have been keeping records on the number of breaks as well as the size and pipe material for each break. For each of those years, the number of breaks would typically range between 500 and 700 breaks. Below is a graph for the most current records indicating a total of 556 pipe breaks for waterlines ranging in size from 1.5-inches to 20-inches. These know breaks can result in a substantial amount of water loss. However it is believed that there are a significant number of breaks in the small and larger water lines that go undetected especially in the karst areas of AWU's service area.



Austin Water Utility is currently initiating a Condition Assessment Program for large diameter transmission mains. It is believed that this program will identify existing leaks that are now undetected as well as structural weaknesses that may result in future catastrophic failures. Repair of these lines should significantly reduce the annual unaccounted water in the system.

For large diameter transmission mains AWU will be utilizing a new leak detection technology that is non intrusive (no equipment will be inserted into the pipe) and can operate at flow velocities down to zero feet per second. This technology is new and uses advanced signal conditioning and enhanced cross-correlation techniques to locate leakage on large diameter pipes. Other more invasive leak detection techniques may also be employed.

Other relatively new technologies such as the Remote Field Transformer Coupling System will also be employed. This technology will assist the Utility in determining the structural integrity of the Concrete Steel Cylinder (CSC) transmission lines. Identifying problems and repairing the pipe early should reduce the chances of catastrophic failures. Attached is an overall map that identifies approximately 266 miles of CSC pipe in the system that will require this Condition Assessment.


CSC Water Mains (266 miles) and Broken Valves
N
W
E
S
0 1.25 2.5 5 Miles
Large Broken Valves (36)
Small Broken Valve (12)
CSC_pipe
Water Line by Zone >= 16"
PR_ZONE
Central
North South
Northwest A Southwest A
Northwest B Southwest B
Northwest B WBC
Northwest C Southwest C
Boosted
Central Reduced
North Reduced
Northwest A Reduced
Northwest B Reduced
Northwest C Reduced
South Reduced
Lost Creek Reduced
Southwest A Reduced
Southwest B Reduced
Southwest C Reduced
Private
Abandoned

(3) Technical Project Description

(a) Recovery Act-specific Criteria

(a.1) Rapid Expenditure of Funds

Utilizing the latest innovative leak detection technology available, it is assumed a condition assessment report will be completed on approximately 740,000 linear feet of large diameter distribution mains within nine months of receiving the grant award. It is anticipated the contractor will be able to begin in August 2009. AWU also has additional funds budgeted to rehabilitate or replace deteriorated transmission main if the condition assessment identifies a need.

(a.2) Contract Status

Leak detection Contracts for the above projects are in process of being executed by the Austin Water Utility.

Spending Plan

	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	TOTAL
Project													
Burleson Rd from Hwy 183 to FM 973	$130,000	$200,000	$200,000										$530,000
Johnny Morris from FM 969 to E. Austin Reservoir	$139,500	$225,000	$225,000	$225,000	$225,000								$1,039,500
Johnny Morris from Daffen Ln to Hwy 290						$87,850	$125,000						$212,850
W. Lynn from 2nd St. to 34th St.				$158,100	$150,000	$150,000	$225,000						$683,100
Davis High Service from FM 2222 to Davis WTP							$159,350	$200,000	$200,000				$559,350
Davis WTP to Lamar								$125,200	$175,000	$175,000			$475,200
	$269,500	$425,000	$425,000	$383,100	$375,000	$237,850	$509,350	$325,200	$375,000	$175,000	$0	$0	$3,500,000

(b) Conservation, Efficiency, Markets

(b.1) Water marketing or banking elements

This project does not involve water marketing or banking efforts. The water saved by the program will be available in the Austin Water Utility distribution system to all existing and new customers.

(b.2) Water Conservation and efficiency

The City of Austin with 796,505 Retail and 54,000 Wholesale users serves a population of 850,505 out of the 1,598,161 Austin 2007 metropolitan population. The growth in population and demand has increased the average daily demand for water from 40 MGD in 1995 to 158 MGD in 2009. The drawn water from Colorado River is currently being treated at Davis and Ullrich Water treatment plants and distributed throughout the service area through large diameter PCCP and Ductile Iron transmission lines. Executing the Leak detection program will help the city to be able to market approximately 3.6 billion Gallons of water per year without any additional treatment cost. Identifying leaks along with replacement or rehabilitation of the leaking segments of the system will reduce the energy needed to pump water through the distribution system and conserve water by approximately 1.2% of average daily usage.

The City has a growing demand of 156,747 acre-feet per year of water supply with over 611 miles of transmission main 16-inch and greater in diameter and 2,983 miles of distribution lines 16-inch and less in diameter. As of 2007, the last for which an analysis is available, Austin Water Utility lost an estimated 5.4 billion gallons of water or 11.4% of total system input. Out of which approximately 70% or 3.6 billion gallon was "real loss" due to leak and beaks. This translates to an approximate total loss of 16.4 billion gallons acre-feet per year, or real losses of 11.033 acre-feet per year.

The leak detection Program will save approximately 1900 acre- feet per year or 1.2% of the current water supply, based on a projected savings of 0.125 MGD per mile of transmission main.

(b.3) Improved water management

This project has a direct, quantifiable impact on water savings.

(b.4) Cost-Benefit Analysis

With conserving 1,900 acre-ft per year of water and anticipated lifespan of 20 years and a total project budget the demand acre-feet can be calculated as follow:

$$\frac{\$3,500,000}{1,900 \text{ acre-ft/Yr} \times 20 \text{ years}} = \$92.10 \text{ per acre-ft}$$

The requested funds are essential in execution and completion of the innovative leak detection and rehabilitation program and conserving water.

(c) Sustainable Water Supplies and Collaboration

(c.1) Sustainable Water Supplies for the 21st Century

The program will address water supply needs by reducing water leaks within the Austin Water Utility (AWU) service area. Water conservation is an issue of increasing importance to our community and plays an escalating role in future water supply due to the region's climate variability.

The program will conserve water from the Lower Colorado River by reducing the amount drawn by Austin Water Utility for pumping and treatment. This leaves more water in the river for downstream uses and for fish and wildlife habitats.

(c.2) Collaboration and stakeholder involvement

The Central Texas region is currently in an exceptional drought and experiencing continued population growth. Any reduction water loss will help to prolong our need to negotiate future water supply.

(c.3) Reclamation Project Connection

The program is not connected to Reclamation project activities.

(d) Demonstrated Results

(d.1) Water Conservation Planning

In May of 2005, the City of Austin adopted a Drought Contingency Plan with stages that would trigger higher levels of water conservation.

> Stage 1 of the plan goes into effect from May 1 thru September 30th. The goal is to keep water use from exceeding Stage 2 three-day trigger.
>
> Stage 2 is triggered when demand exceeds 247 million gallons per day for three consecutive days. The goal is to reduce water use by 15 percent from Stage 2 one-day trigger.
>
> Stage 3 trigger is determined by the director. Its goal is to reduce water use below the Stage 2 three-day trigger with additional reductions as determined necessary by the Director.

AWU has recently implemented a "System Wide" leak detection program for both large and small diameter water lines. This program is a high priority within the program in and effort to reduce the estimated five billion gallons of unaccounted water annually. In addition this program will assist the Utility in identifying areas with deteriorated water lines that are in need of replacement or upgrading. It is believed that this replacement program will reduce the over 600 water line breaks experienced annually within the system. Reducing the number of breaks should significantly reduce the water loss.

Within the last 18 months, AWU has started an initiative to upgrade older water lines that have been identified as deteriorated pipe and/or have a history of breaks. The Utility currently has approximately 41 miles of deteriorated pipe in some state of design from preliminary, design, bidding or complete. With over 900 miles of deteriorated pipe identified and over 3,500 miles of total water lines, the Utility is aggressively advancing the program to continually upgrade its aging infrastructure.

(d.2) Project Performance Measures

Along with the conservation measures outlined in the "Drought Contingency Plan" the initiative for leak detection and upgrading the aging water distribution lines are on a parallel track in reducing the Utility annual water loss thus maximizing its long-term water supply agreement for 250,000 acre-feet of water from the Lower Colorado River Authority. The new leak detection technology will assist the Utility in prioritizing areas with needs and develop a more systematic approach to upgrading its infrastructure. These measures should also reduce the cost for maintenance crews having to respond to the overwhelming number of breaks.

The innovative leak and rehabilitation program is part of city of Austin planning to manage its drinking water system with efficiency and within a short time frame without impacting supply of the water to the community. The Austin Water Utility considers that the program makes a significant contribution to protection of the water environment. It

also believes that the current planning should be used as a breathing space to great much needed green projects and developing the economy. The savings from water efficiency planning are built into the future demand forecasts and are in accordance with state of Texas plans in saving water by municipalities.

AWU has adopted a standardized approach recommended by the Texas Water Development Board for water loss calculations. Annual or regular water loss calculations will be used to analyze water loss performance, track the Utility's progress on a year-to-year basis and set performance targets.

(d.3) Quantification of Project Benefits

Projected water savings for the leak detection program is based on the following formula:

Number of leaks per mile of transmission main X Average water loss rate per leak

Where:
Number of leaks per mile of transmission main is assumed to be 2.5; and
Average water loss rate per leak is assumed to be 50,000 gallons per day.

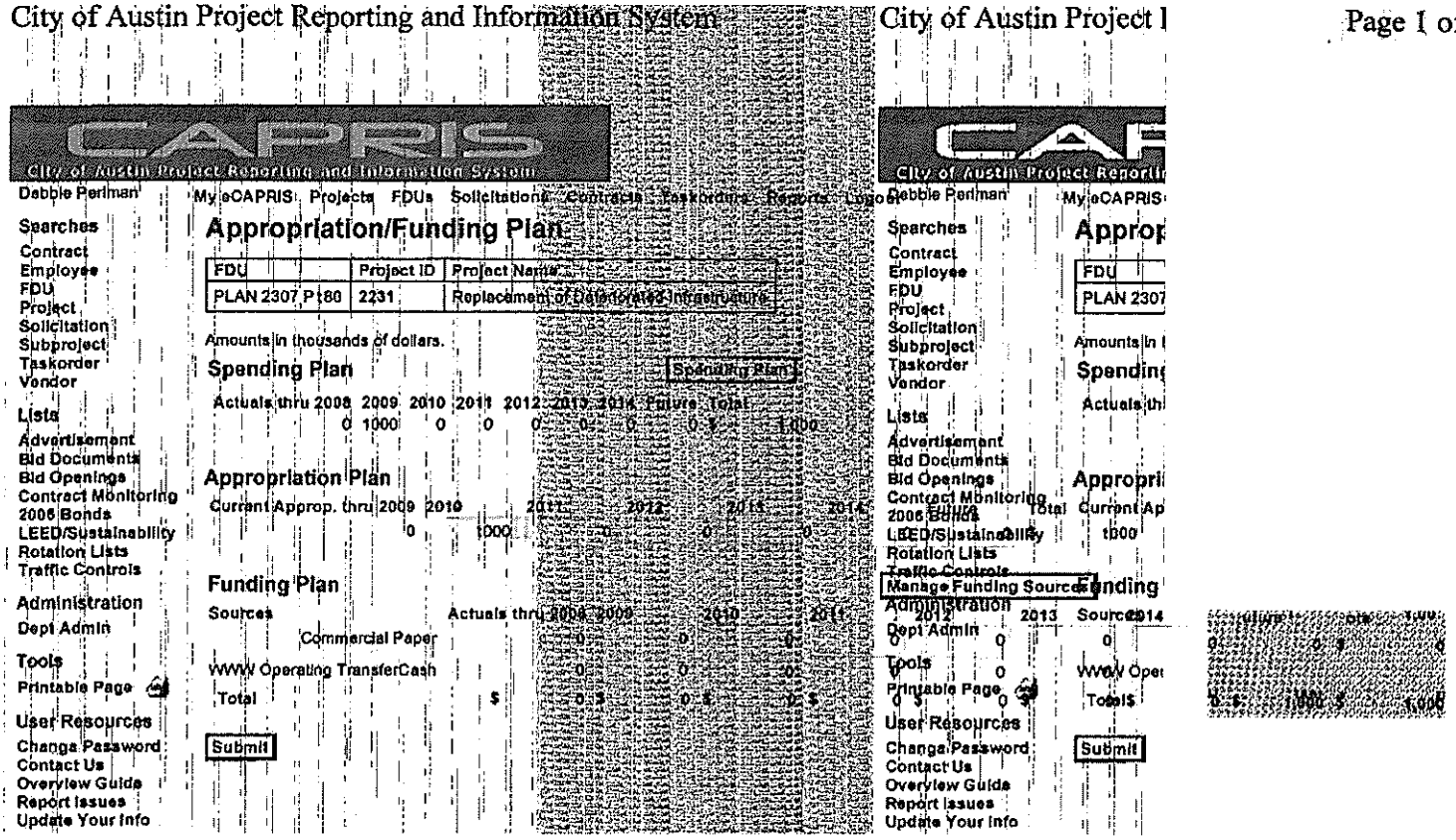
2.5 leaks/miles X 50,000 gallons/leak/day = 125,000 gallons/day/mile

(e) Project Financing and Cost Sharing

(e.1) Financial Ability to Pay

(a) Non-Reclamation Funding. All non-Reclamation funding for this project is available in the Austin Water Utility budget for the Water Distribution System Engineering division. Additional funds are being requested in the FY10 budget, which has yet to be approved by City Council.

(b) Budget Reports. Budget reports are attached showing available funding in the current fiscal year (FY09) for the Water Distribution System Engineering Division of Austin Water Utility. Staff costs will be paid from the available Personnel budget, and office supplies from the remaining Commodities funds. The rehabilitation/replacement cost for the Utility's FY10 budget, $1,5000,000 and the additional $1,000,000 for the Condition Assessment Contractual Services has yet to be approved by Council and is not attached.



CAPRIS
City of Austin Project Reporting and Information System

Debbie Perlman | My eCAPRIS | Projects | FDUs | Solicitations | Contracts | Taskorders | Reports | Logout

Searches
Contract
Employee
FDU
Project
Solicitation
Subproject
Taskorder
Vendor

Lists
Advertisement
Bid Documents
Bid Openings
Contract Monitoring
2006 Bonds
LEED/Sustainability
Rotation Lists
Traffic Controls

Administration
Dept Admin

Tools
Printable Page

User Resources
Change Password
Contact Us
Overview Guide
Report Issues
Update Your Info

Appropriation/Funding Plan

FDU	Project ID	Project Name
PLAN 2307 P160	2231	Replacement of Data/Voice Infrastructure

Amounts in thousands of dollars.

Spending Plan

Spending Plan

Actuals thru 2008	2009	2010	2011	2012	2013	2014	Future	Total
0	1000	0	0	0	0	0	0	1000

Appropriation Plan

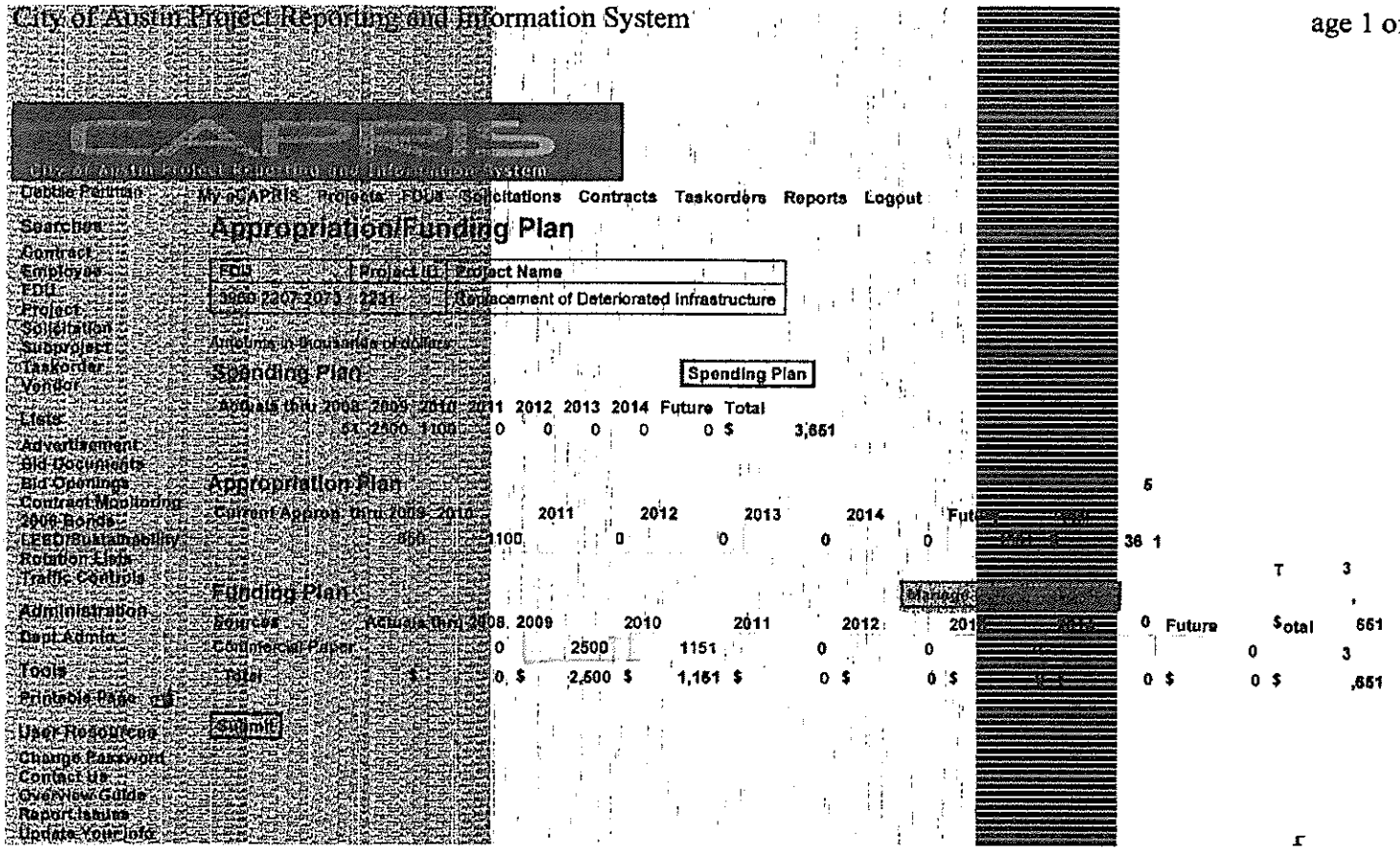
Current Approp. thru 2009	2010	2011	2012	2013	2014	Future	Total
0	1000	0	0	0	0	0	1000

Funding Plan

Manage Funding Sources

Sources	Actuals thru 2008	2009	2010	2011	2012	2013	2014	Future	Total
Commercial Paper	0	0	0	0	0	0	0	0	0
WWW Operating TransferCash	0	0	0	0	0	0	0	0	0
Total	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

Submit



(c) Cost Increases. No increase in staff or supply costs is projected, but if such increase were to occur, it would be funded from the Austin Water Utility budget. Any decrease in costs will be shared proportionately between grant funds and Austin Water Utility funding.

(d) Cost-Sharing Partners. No cost-sharing partners exist for this project.

(e.2) Reasonable Costs

The budget is predominantly allocated to the direct costs of the contract for leak detection services. Staff oversight and overhead costs for the contract makes up a relatively small percentage of the overall program costs.

(e.3) Non-Federal Funding

Austin Water Utility will provide 63% of project costs.

(f) Performance Measure for quantifying Actual Post Post-Project Benefits

The performance measures that we expect to utilize will be the anticipated reduction in unaccounted water as well as the reduction in annual water main breaks. With ARRA additional funding the UWU will be able to accelerate the amount of leak detection on both small and large diameter water lines. With the subsequent repairs and condition assessment of the lines in the area, it is anticipated that unaccounted water and number of breaks should be reduced.

(g) Description of Potential Environmental Impacts

(g.1) Impact on Environment

AWU will meet all local, state and federal requirements for air and water quality for all projects. The project areas do not consist of any known archeological sites, irrigation systems, buildings or structures and is within city of Austin Rights of Way. However. in accordance with city of Austin contract documents, contractors are required to comply with the requirements set in the contract documents.

(g.2) Impact on Endangered Species

The Utility is aware of all identified endangered or threatened species in the area and take the necessary precautions for their protection.

(g.3) Impact on Wetlands

There is no anticipated adverse effect on any wetlands.

(g.4) Water Delivery System

Austin's first organized water system be gan in 1871, whe n a private com pany be gan pumping water from the Colorado River to citizens' homes under a franchise granted by the City of Austin. By May of 1893, Austin Dam spanned the Colorado River, and the newly f ormed Lake Austin provid ed the City with its f irst reliable w ater and po wer source. In 1923, Dr. E.P. Schoch, a chem ical engineering professor at the University of Texas at Austin, created a simple chemical treatment that used lime to treat river water. Austin included this treatment method in the design of a new facility that came on line in 1925. The facility, now named the Thomas C. Green Water Treatment Plant, consisted of a chemical building, mixing baffles, a sedimentation basin, filters and a clearwell for water storage. Green Water Treatment Plant was decommissioned in September of 2008. Davis Water Treatment plant is AWU's oldest operational facility, constructed in 1954.

(g.5) Modification of Irrigation Systems

The project will not result in the modification of any features of an irrigation system.

(g.6) National Register of Historic Places

It is not anticipated that any of the buildings participating in the program will be eligible for listing in the National Register of Historic Places.

(g.7) Water Delivery System

There are no known archeological site s in the proposed project area.

(h) Required Permits or Approval

Per City of Austin permit requirements all projects are required to comply with city, state and county permit requirements. The leak detection and rehabilitation program is no exception to this requirement.

(i) Funding Plan and Letter of Commitment

(i.1) Applicant Contribution

Austin W ater Utility' s contribu tion to th e cost-sha re re quirement will com e f rom budgeted funds for staf f costs, office supplie s and rebate program s. These funds are budgeted annually for the Water Utility from rates paid by customers.

(i.2) In-kind Costs

In-kind costs that are incurred before the anticipated project start date would be limited to staff time required to successfully negotiate the leak detection contracts.

(i.3) Funding Partners

There are no partners providing funding for this project.

(i.4) Level of Acceptable Funding

The Federal funding requested for this project is less than $5,000,000.

(i.5) Additional Federal Funding

There is no additional Federal funding requested or received for this project.

(i.6) Pending Funding Requests

There are no pending funding requests for this project.

(j) Official Resolution

The timing of meetings for the Water and Wastewater Commission and the Austin City Council prevent the inclusion of an official resolution with the grant application. However, it it's the applicant's intent to provide an official resolution within 30 days of the application deadline.

(k) Budget Proposal

(k.1) General Requirements

The current budget allocated for the condition assessm ent of sections of the l arge diameter water lines and the valves is $1,000,000 with estim ated rehabilitation cost of $2,5000,000. The requested ARRA fund is essential to include a dditional sections of the water lines in need of assessment and rehabilitation.

Upon com pletion of leak detection program city would save an estimated am ount of $204,000 or 1.2% annually on its current $17 million dollars O&M budget.

(k.2) Budget Chart

The cost of leak detection utilizing non intrusive tec hnology is approximately $14.14 per linear foot (LF). The c urrent budg et of $1 m illion dollars enables th e city to as ses the condition of approximately 2% of its current large diameter water lines with an estim ated rehabilitation cost of $35.36 per LF. The proposed budget is only an estimate and may be increased upon discovery of leaks and full condition assessment review; all of which will be absorbed by the applicant.

AWU currently has the following funds available for FY 2009-2010:

	Condition Assessment of Transmission Lines	$1,000,000
	Repair of identified problems on Transmission Lines	$1,500,000
Repair/Rep	lacement of Large Diameter Valves	$1,000,000
TOTAL		$3,500,000